OUTLOOK FOR FARM PRODUCTION EXPENDITURES*

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My analysis focuses on farm expenditures for production inputs other than those inputs produced on farms such as fuels, seeds, and livestock. For the sake of manageability, I have also excluded taxes, building construction, and services such as repairs and maintenance, custom hire, insurance, and marketing. All told, the items that I have included --fertilizer, fuel, pesticides, land rental, machinery purchases, interest, and hired labor--account for just slightly less than one half of all farm business expenditures.

Annual farm production expenditures are not exactly equivalent with annual farm production expenses. The former includes spending on capital goods as well as operating expenses, while the latter omits capital spending but includes capital consumption. Thus, expenses exceed expenditures in years when the gross value of farm capital is declining as has been the case since 1980, and expenditures exceed expenses in years of gross capital accumulation. Expenditures are a more accurate measure of annual cash out-flow than are expenses.

Production expenditures peaked at more than $135 billion in 1979 and have declined each year since then, falling by a total of nearly 6 percent through 1983 based on preliminary 1983 data (Table 1). This decline was triggered by downward pressures on farm incomes beginning in 1980 and reflects the combined impacts of sharply reduced machinery purchases throughout the period, price declines in the last year or two for fertilizer, fuel, borrowed money, and cropland rental, and lower use of variable crop production inputs such as fertilizer, fuel, and pesticides due to recent acreage reductions. There has also been an appreciable decline in expenditures for inputs of farm origin, particularly feed and livestock (mostly cattle).

Total expenditures are projected to increase significantly in 1984, recovering most or all of the decline realized from 1980 through 1983. Increases seem likely in virtually every category of non-farm produced inputs, with the largest gains for variable crop production inputs and a modest upturn in machinery expenditures.

These projections are based upon several assumptions. Most importantly: 1) 1984 inflation rate of around 5 percent, 2) 1983 net farm income in the $25-27 billion range, and 3) a 40-45 million acre increase in land planted to the major field crops in 1984, with at least one half of that expansion coming in corn acreage.

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* Comments prepared for the 1983 Midwest Agricultural Outlook Conference, Ames, Iowa, August 17-18, 1983. Assistance by Maurice Klein, Agricultural Economics Librarian, Ohio State University, is gratefully acknowledged.

Fertilizer

Fertilizer use was cut sharply in 1983 due to acreage reductions (Table 2). Use of phosphate and potash has trended downward since 1980 as farmers have tried to trim expenses without jeopardizing yields. Thus, P and K levels have been reduced on much cropland and will have to be rebuilt as income allows. Nitrogen use was reduced significantly this year due mainly to the large corn acreage decrease. Prices for all fertilizer nutrients were lower this year reflecting lower fertilizer demand, excess production capacity, and intensive price discounting on imports.

Consumption should expand appreciably for the 1984 crops, responding to acreage expansion as well as relatively heavy application rates that will be encouraged by high '83 crop prices, efforts to recover from weather-reduced '83 corn and soybean yields, and several years of "mining" P and K nutrients from cropland. Prices are not likely to increase much more than inflation, except for potash where a stronger Canadian dollar could boost U.S. prices nominally. Somewhat over one half of the U.S. supply originates in Canada.

Despite an expected upturn in demand, price increases will be limited by excess capacity in the fertilizer industry. U.S. consumption has been accounting for less than 70 percent of the domestic nitrogen production capacity and little more than one third of the phosphate capacity. Total North American potash use is less than 50 percent of combined U.S. and Canadian production capacity. Deregulated, higher cost natural gas, the primary feedstock for anhydrous ammonia manufacture, is likely to have little impact on nitrogen fertilizer prices next year for several reasons, even though it may cause a few ammonia plants to close permanently. Most plants operate on low-cost, long term interruptable supply contracts, less than 50 percent of all natural gas will be price deregulated by 1985, and expanding foreign ammonia production from essentially free natural gas that would otherwise be flared off in the process of crude oil production is resulting increase imports of relatively low-cost product.

Fuel

Use of liquid fuels on farms has declined appreciably since 1978 as farmers have responded to high fuel prices by adopting fuel-conserving practices (Table 3). Chief among these has been the substitution of larger diesel-powered tractors for smaller gasoline powered units. Larger units use less fuel per acre than do smaller machines, and diesel engines are generally more fuel-efficient than are gasoline engines.

Use was cut further in 1983 due to acreage reductions. Prices for both gasoline and diesel fuel declined early this year due to generally weak demand and OPEC price-cutting, while L.P. gas prices have increased significantly. L.P. is produced largely from domestic natural gas and has been impacted directly by price deregulations under the provisions of the Natural Gas Policy Act of 1978.

Fuel use on farms will expand in line with acreage increases in 1984, with larger gains for diesel, due to the growing relative importance of diesel power in crop production, and for L.P. gas, given the likelihood of larger harvests and thus increased crop drying. World prices for crude oil now look to stabilize around the $28-29 per barrel level, assuming no new turmoil in OPEC, relatively modest expansion in petroleum demand associated with general economic growth, and that political unrest in the mideast does not disrupt the flow of crude oil to the U.S. About one third of the U.S. oil supply is imported.

Prices of diesel fuel are likely to increase more than gasoline next year as domestic economic growth will create a heavier demand for freight transportation, almost all of which is diesel powered. A somewhat higher diesel price is necessary to encourage refiners to expand output of middle distillates relative to lighter fuels such as gasoline. L.P. prices may not increase as much as in 1983 because of new Saudi Arabian production that will be entering the world market. An unusually cold '84 winter, however, would result in higher prices than projected at this point.

Pesticides

As with fertilizer and fuel, use of pesticides has declined in 1982 and 1983 due to acreage reductions, nominally offset by use of herbicides to control weeds on diverted acreage (Table 4). Pesticide use is typically more variable, however, depending upon the magnitude of pest problems, particularly insects and fungus, during the growing season. Also, substantial gains have been made in pesticide use technology including integrated pest management, more accurate placement equipment, and computerized application control.

Pesticide use is expected to increase in 1984 as crop acreage expands. Over 96 percent of all corn and soybean acres are now treated with chemical herbicides annually, thus use is directly proportional to acreage. Continued gains will be made in use efficiency. However, this will be partially offset by the use of a broader range of pesticides, particularly herbicides, in reduced tillage systems.

Price increases, which averaged 8 percent annually from 1979 to 1982, eased significantly this year primarily due to reduced demand and large stocks. Overall, unsold manufacturers stocks at the beginning of the 1983 planting season were about twice their normal size. Widespread price discounting resulted. Even though the price index for all pesticides has increased somewhat this year, prices for herbicides have averaged about 4 percent less than in 1982. Because herbicides dominate farmer pesticide purchases, total 1983 pesticide expenditures have declined more than is suggested by the combined changes in consumption and price indices.

Prices are expected to increase only modestly in 1984 despite increase use, due primarily to excess production capacity. Domestic pesticide output this year has run at about 55 percent of production capacity, down from 65 percent in 1982 and 80-90 percent in the late 1970's. Excess capacity and corresponding price weakness appears to be greatest for the large-volume herbicides, particularly atrazine, 2,4-D and trifluralin.

Cropland

Land rental costs tend to reflect a combination of land values and crop production profitability. In 1981, farmland values, based on current transaction prices, began to ease back from the rapid escalation of the 1970's. In 1982 they declined marginally and are down nearly 6 percent, on average, this year (Table 5). Both income and cash flow problems for farmers and a substantial reduction in speculative or inflation-hedge bidding by nonfarm investors had major impacts.

Improved crop prices and higher farm incomes should spark increased interest in buying farmland by farmers with reasonable debt loads, for expansion purposes. There are a number of offsetting factors, however, that are likely to limit price increases for farmland in 1984. Relatively high interest rates and modest inflation should help keep nonfarm investors away from the land market. Farm lenders are likely to continue to be cautious in making real estate loans. Furthermore, it appears that there will be an increase in distressed sales by farmers who fell into substantial financial difficulties in 1981 and 1982 but only postponed the inevitable by piecing together "hang on" financing for 1983.

Increases in cropland rental costs slowed appreciably with weakening land values and lower farm incomes in 1981 and 1982, and rental rates appear to have actually declined, on average, in 1983 (Table 6). For next year, higher 1983 farm incomes and increased 1984 crop acreage should be strengthening factors, partially offset by the relatively small gains expected in farmland values.

Farm Machinery

The farm machinery industry, in a typically cyclical situation, has fallen on hard times in recent years. Total sales have declined dramatically since the late 1970's, reaching a low of about $7.6 billion in 1982, 36 percent less than as recently as 1979 (Table 7). Declining sales reflect the combined effects of reduced farm income, high interest rates, major purchases of new, bigger equipment in the late 1970's, and fewer big machines replacing more smaller machines on many farms.

The sales slump appears to have bottomed-out in late 1982 or early 1983 and should continue to rebound in 1984. Improved cash flow to crop farmers, due in large part to government payments and some discounting of PIK entitlements, plus lower interest rates generated renewed buyer interest this past spring. Price discounting, rebates, and subsidized interest rates by manufacturers have also been factors. Much of the machinery purchased in the late 1970's is now wearing out. High repair and maintenance costs on that equipment should encourage farmers to consider purchasing new replacements. Higher farm income expectations are also encouraging.

Changes in list prices for farm machinery closely parallel changes in inflation rates. List prices tend to overstate actual transaction prices in periods of weak sales, however, due to discounting and other deal-making. Manufacturers have utilized many types of sales incentives that effectively reduce actual sales prices in order to move inventories. At the beginning of 1983, inventories of unsold machinery amounted to about a one year's supply at 1982 sales rates despite a one-third cut in production since 1979. Likewise, dealers have engaged in discounting in order to survive in a declining market: about 5 percent of the farm machinery dealers have gone out of business in each of the past two years. Discounting will continue to be a factor as sales turn upward, but will be less extensive.

Credit

Interest costs are a major component of farm production expenditures, accounting for about 10 percent of the total. The components are total debt and interest rates. Total farm debt has risen dramatically: in 1982 it was nearly 4.5 times larger than 15 years earlier. However, the rate of increase has slowed in the last few years (Table 8), with 54 percent of the gain in 1983 due to larger outstanding CCC commodity price support loans and relatively small growth in real estate and operating loans.

Total debt may show little or no increase next year, reflecting a nominal increase in real estate loans, a modest increase in intermediate credit and operating loans, and a decline in CCC price support loans. Cautious lending practices, debt repayment, forced liquidations, higher commodity prices, and increased competition for funds from consumers, industry, and government are all factors.

Interest rates eased back from their 1981 highs from year and have fallen appreciably in 1983. When combined with a lower rate of growth in debt, this has lowered total interest expenditures for the first time in many years. I expect interest rates to edge upward throughout the remainder of 1983 and 1984, reflecting, among other things, "election yar mentality" that results in little, no or negative progress toward reducing federal deficits and a higher inflation expectation associated with monetary relaxation.

Hired Labor

Farm labor wage rates have trended upward along with wages in general, however, the rate of increase has not matched that for factory workers since 1979 and the overall farm wage rate remains well below that for their factory counterparts. The total farm labor bill is more variable than are wage rates, reflecting changes in farm employment.

A recession-related slowdown in factory wage rate increases in 1982 and 1983 spilled over into farm labor wages. But, weak farm incomes have increased resistance by farmer operators to hiking wages, further widening the factory-farm wage gap. A nominal decline in hired farmwork during 1983, largely associated with reduced field crop production, has helped stabilize total wage expenses this year. With economic recovery under way and total employment climbing to record levels, factory wages will most likely edge up somewhat faster in 1984. Farm wage rates may have to increase at least as rapidly to compete with expanding nonfarm employment opportunities, thus increasing total farm expenditures on hired labor.

Farm Size

While total farm production expenditures have declined somewhat over the past four years, and while only relatively modest increases are projected in prices for inputs of nonfarm origin in 1984, not all farms experience equal impacts. In actuality, operators of the larger farms tend to pay less per unit of input than do operators of smaller farmers.

A number of studies have shown that larger farms often pay less for inputs (Faris and Armstrong, Krause and Kyle, Hall and LeVeen). In 1981, questions concerning discounts

received on purchased inputs (seed, fertilizer, pesticides, and machinery) were included in a survey of 2005 Ohio farm operators. Results were consistent with earlier reports (Figure 1). About 65 percent of the farms with 1000 or more acres reported discounts on these purchased inputs, compared to an average of less than 26 percent for farms smaller than 1000 acres. Discounts averaged 8.3 percent for the 1000 acre and larger farms, and 3 percent for all others. Based upon Ohio crop enterprise budgets, these input discounts alone generate a cost advantage of more than 6 cents per bushel of corn for the 1000 acre farm compared to averages for farms of less than 180 acres.

Selected References

Faris, J.E. and D.L. Armstrong, "Economics Associated with Size, Kern County Cash-Crop Farms," Giannini Foundation Research Report No. 269, University of California, Berkeley, December 1963.

Krause, K.R. and L.R. Kyle, "Economic Factors Underlying the Incidence of Large Farming Units: The Current Situation and Probably Trends," AJAE 52:5 (December, 1970), pp. 748-760.

Hall, B.F. and E.P. LeVeen, "Farm Size and Economic Efficiency: The Case of California," AJAE 60:4 (November, 1978), pp. 589-600.

Table 1. U.S. Farm Production Expenditures, 1980-1984

	$Bil.					% Change From Year Earlier				
	1980	1981	1982	1983 1/	1984 2/	1980	1981	1982	1983 1/	1984 2/
Fertilizer	10.13	9.91	9.52	8.1-8.3	9.6-10.0	15.6	(2.2)	(3.9)	(12-15)	17-22
Fuel	7.92	8.22	7.73	6.7-7.0	7.6-7.8	20.7	3.8	(6.1)	(9-13)	12-15
Pesticides	3.07	3.55	3.52	2.8-3.0	3.3-3.5	0.3	15.7	(0.6)	(14-20)	12-18
Rent 3/	11.84	10.99	11.24	10.9-11.0	11.2-11.3	14.5	(7.2)	2.3	(2-3)	2-3
Machinery	10.57	10.27	7.63	7.7-7.8	8.4-8.6	(10.9)	(2.9)	(25.7)	2-3	8-10
Interest	10.39	12.14	13.59	12.6-12.9	13.2-13.4	12.8	16.8	11.9	(5-7)	4-6
Labor	9.96	9.88	11.59	11.5-12.0	12-12.5	5.7	(0.8)	17.3	0-35	2-6
Sub-Total	63.88	64.96	64.82	60.3-62.0	65.3-67.1	7.9	1.7	(0.2)	(4-7)	7-10
Other 4/	70.4	66.8	66.1	66.0-67.0	68.0-71.0	(4.7)	(5.1)	(1.0)	0-1	2-6
Total	134.3	131.8	130.9	126-129	134-137	(0.6)	(0.9)	(0.7)	(1-3)	4-7

1/ Preliminary

2/ Estimate

3/ Includes cash and share

4/ Includes farm services other than rent, feed, livestock, motor vehicles, taxes, buildings, repairs, and improvements. Actual data for 1980-1982. Calculated as a residual for 1983-1984.

( ) = negative number

Table 2. U.S. Fertilizer Consumption and Prices, 1980-1984

						% Change From Year Earlier				
	1980	1981	1982	1983	1984	1980	1981	1982	1983	1984
	----------Mil. Nutrient Tons----------									
Nitrogen(N)	11.41	11.92	11.08	9.1-9.3	10.7-11.0	6.5	4.5	(7.1)	(15-18)	16-20
Phosphate (P_2O_5)	5.43	5.43	4.82	4.0-4.1	4.6-4.8	(3.1)	0	(11.3)	(14-16)	14-18
Potash (K_2O)	6.25	6.32	5.61	4.6-4.7	5.3-5.5	0	1.2	(11.2)	(16-18)	14-18
	----------$/Product Ton----------									
Anhydrous Ammonia	229	243	235	236-240	250-260	33.9	6.1	4.9	(6-7)	4-8
Triple Super Phosphate	247	248	230	214-218	225-235	53.4	0.4	(7.3)	(5-6)	4-9
Muriate of Potash	135	152	155	142-145	150-160	26.2	12.6	2.0	(7-9)	6-11

1/ Preliminary

2/ Estimate

Table 3. Fuel Use On U.S. Farms And Fuel Prices, 1980-1984

						% Change From Year Earlier				
	1980	1981	1982	1983 [1]	1984 [2]	1980	1981	1982	1983 [1]	1984 [2]
	---------- Billion Gallons ----------									
Gasoline	NA	3.0	2.8	2.4-2.5	2.6-2.7	NA	(14.3) [5]	(6.7)	(11-14)	6-10
Diesel	NA	3.1	3.2	2.7-2.8	3.1-3.2	NA	(6.1) [5]	3.2	(12-15)	10-15
L.P. Gas	NA	1.0	1.0	.75-.85	9-1.0	NA	(28.6) [5]	0	(15-25)	12-18
	----------$/Gallon----------									
Gasoline [3]	1.24	1.29	1.23	1.16-1.20	1.20-1.25	55.0	4.0	(4.7)	(2-5)	2-6
Diesel [4]	.99	1.16	1.11	.98-1.00	1.08-1.12	44.7	17.4	(4.3)	(10-11)	9-13
L.P. Gas	.62	.70	.71	.77-.78	.80-.82	40.7	12.6	1.3	8-9	6-7

1/ Preliminary

2/ Estimate

3/ Bulk delivered regular, includes federal and state excise taxes

4/ Excludes federal and state excise taxes

5/ Change from 1978

Table 4. Pesticide Use on U.S. Farms and Pesticide Prices 1980-1984

						% Change From Year Earlier				
	1980	1981	1982	1983 1/	1984 2/	1980	1981	1982	1983 1/	1984 2/
	---------Index of Consumption 3/--------- (1977=100)									
Use	150.3	159.7	148.1	133.3	145-150	(5.6)	6.3	(7.3)	(10.0)	8-12
	----------Index of Avg. Price---------- (1977=100)									
Avg. Price	102	111	119	124	129-133	6.3	8.8	7.2	4.2	4-7

1/ Preliminary

2/ Estimate

3/ Calculated by dividing total expenditures on pesticides by the index of average prices.

Table 5. Farmland Values, U.S. and 10 Midwest States, 1980-1984

	$/Acre				
	1980	1981	1982	1983	1984 1/
U.S. (48 States)	725	795	789	744	750-760
% Change From Year Earlier	15.4	9.7	(0.7)	(5.7)	1-2
Nebraska	600	660	626	563	*
Kansas	573	590	585	544	*
Minnesota	1061	1231	1197	1065	*
Iowa	1811	1941	1802	1568	*
Missouri	878	941	872	759	*
Wisconsin	980	1105	1073	1019	*
Illinois	2013	2133	1940	1727	*
Indiana	1833	1972	1715	1492	*
Michigan	1082	1232	1192	1109	*
Ohio	1678	1727	1474	1297	*

* No projections for individual states

1/ Estimate

Table 6. Cropland Cash Rents, 10 Midwest States, 1980-1984

	$/Acre					% Change From Year Earlier				
	1980	1981	1982	1983	1984 1/	1980	1981	1982	1983	1984 1/
Nebraska 2/	100.20	109.00	111.00	105.50	*	9.4	8.8	1.8	(5.0)	*
Kansas 2/	60.90	64.00	62.80	62.50	*	3.6	5.1	(1.9)	(0.5)	*
Minnesota	62.90	68.80	72.40	71.30	*	7.9	9.4	5.2	(1.5)	*
Iowa	107.10	113.60	118.80	117.10	*	8.1	6.1	4.6	(1.4)	*
Missouri	66.70	68.80	70.00	68.60	*	15.4	3.1	1.7	(2.0)	*
Wisconsin	51.90	55.70	58.10	57.00	*	8.1	7.3	4.3	(1.9)	*
Illinois	107.00	113.80	119.40	116.30	*	8.1	6.4	4.9	(2.7)	*
Indiana	101.90	108.30	104.90	100.20	*	11.1	6.3	(3.1)	(4.5)	*
Michigan	49.40	51.90	55.40	57.30	*	18.8	5.1	6.7	3.4	*
Ohio	81.80	87.70	88.40	89.10	*	6.5	7.2	0.8	0.8	*
Average 3/	79.00	84.16	86.12	84.50	85-87	9.4	6.5	2.3	(1.9)	+1-2

* No projections for individual states

1/ Estimate

2/ Irrigated cropland

3/ Unwe ted average

Table 7. U.S. Farm Machinery Purchases and Prices, 1980-1984

	1980	1981	1982	1983 1/	1984 2/	% Change From Year Earlier 1980	1981	1982	1983 1/	1984 2/
	----------Unit Sales (1,000)----------									
Tractors 3/	119.3	103.8	77.1	69.4-71	72-74	(14.1)	(13.0)	(25.7)	(8-10)	3-5
Combines 4/	25.7	26.8	16.2	185.5-19	20-21	(20.4)	4.3	(39.6)	14-17	8-12
	-------Avg. Price Index (1914=100)--------									
Tractors and S.P. Equipment	1640	1831	1982	2076	2180-2220	11.9	11.6	8.2	4.7	5-7
Other Machinery	1483	1637	1789	1884	1980-2020	11.3	10.4	9.3	5.3	5-7

1/ Preliminary

2/ Estimate

3/ 40 H.P. and above

4/ Self-propelled

Table 8. U.S. Farm Debt and Interest Rates, 1980-1984

						% Change From Year Earlier				
	1980	1981	1982	1983	1984	1980	1981	1982	1983 1/	1984 2/
	$ Billion									
Total Farm Debt 3/	165.8	182.0	201.7	212-215	213-216	17.8	9.8	10.8	5-7	0-0.5
	Percent									
Avg. Interest Rate 4/	14.5	16.9	16.6	13.9	14.3-14.5	37.0	4.1	(1.8)	(16.6)	4-4.5

1/ Preliminary

2/ Estimate

3/ Outstanding on Jan. 1 for 1980-1982. Annual average for 1983-1984.

4/ Unweighted average of quarterly farm real estate and farm oprating loan interest rates, 7th Federal Reserve District (Chicago)

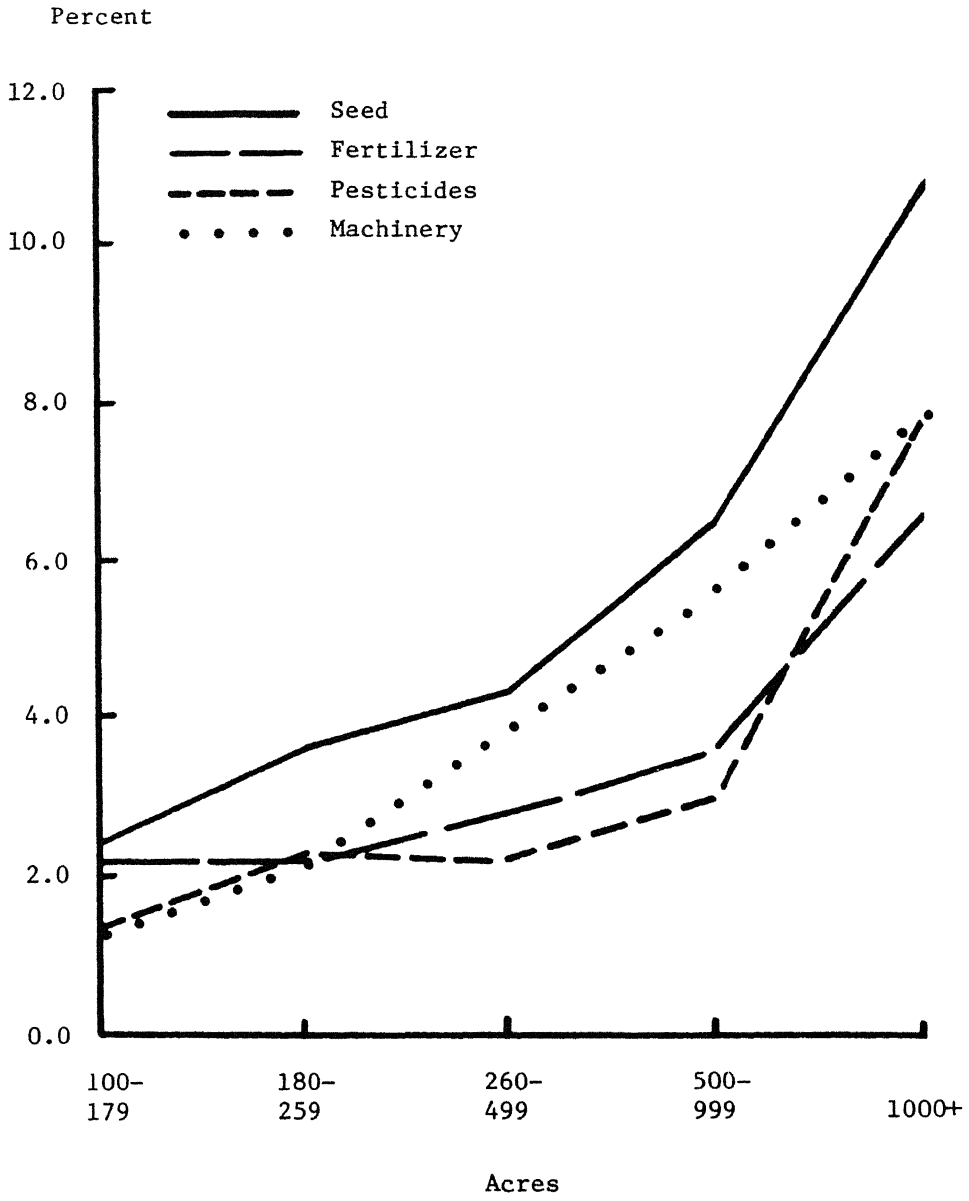
Table 9. U.S. Labor Wage Rates, 1980-1984

	$/Hour Worked					% Change From Year Earlier				
	1980	1981	1982	1983 [1]	1984 [2]	1980	1981	1982	1983 [1]	1984 [2]
Manufacturing Workers	7.27	7.99	8.50	8.78	9.00-9.20	8.7	9.9	6.4	3.3	4-5
Farm Workers	3.66	3.97	4.10	4.21	4.35-4.50	8.0	8.5	3.3	2.7	3-6
Farm as % of Manufacturing	50.3	49.7	48.2	47.9	48					

1/ Preliminary

2/ Estimate

Figure 1: Average Discount Reported by Farm Operators on Seed, Fertilizer, Pesticides, and Crop Machinery by Farm Size, Ohio, 1980-1981[a]



[a]For number of observations on which percents are based see Table 1.

Source:

C. Zulauf and K. King, "Input Purchasing Advantages of Large Farms: An Examination of Ohio Farms," Ohio State University, Agricultural Economics report no. ESO-1029, July 1983.